Section 5: Water Quality

The California Urban Water Management Planning Act (Act) requires that the 2010 Urban Water Management Plan (UWMP) include information, to the extent practicable, on the quality of existing supply sources and the manner in which water quality affects water supply reliability. It is the responsibility of the Vallecitos Water District (VWD) is to protect the water quality of the water entering its distribution system to report water quality information to its customers and the regulatory agencies.

The potable water received by VWD from the San Diego County Water Authority (SDCWA) is a blend from the Colorado River delivered via the Colorado River Aqueduct, and from the Northern California's Bay-Delta via the State Water Project. This water is treated to meet stringent state and federal drinking water standards prior to entering VWD's distribution system. However, source water of degraded quality will make it increasingly expensive and difficult to meet these standards.

This section summarizes water quality issues associated with supplies serving the San Diego region. Information on Colorado River Aqueduct and the State Water Project supplies came in part from Metropolitan Water District of Southern California's (MWD's) 2010 Regional UWMP.

5.1 Colorado River

The Colorado River is one of the two primary sources of VWD's imported water supply. High salinity levels, uranium, and perchlorate contamination represent the primary areas of concern with the quality of Colorado River supplies. Managing the watershed of the Colorado River has been the most effective method for controlling these elements of concern.

5.1.1 Salinity

The salts in the Colorado River System are indigenous and pervasive, mostly resulting from saline sediments in the basin that were deposited in prehistoric marine environments. They are easily eroded, dissolved, and transported into the river system. Agricultural development and water diversions over the past 50 years increase the already high naturally occurring levels of Total Dissolved Solids (TDS).

The Colorado River Aqueduct

Water imported via the Colorado River Aqueduct has a TDS averaging around 650 milligrams per liter (mg/l) during normal water years. During the high water flows of 1983–1986, salinity levels in the Colorado River Aqueduct dropped to a historic low of 525 mg/l. However, during the 1987–1990 drought, higher salinity levels returned. During an extreme drought, Colorado River Aqueduct supplies could exceed 900 mg/l. High TDS in water supplies leads to high TDS in wastewater, which lowers the usefulness of the water and increases the cost of recycled water. In addition to the link between water supply and water quality, high levels of TDS in water supplies can damage water delivery systems and home appliances.

To reduce the effects of high TDS levels on water supply reliability, MWD approved a highly successful Salinity Management Policy in April 1999. One of the policy goals is to blend Colorado River supplies with lower-salinity water from the State Water Project to achieve delivered water salinity levels of less than 500 mg/l of TDS. In addition to fostering interstate cooperation on this issue, the seven Colorado River basin states formed the Colorado River Basin Salinity Control Forum (Forum). To lower TDS levels in Colorado River supplies, the Forum develops programs designed to prevent a portion of the abundant salt supply from moving into the river system. The Colorado River Basin Salinity Control Program targets the interception and control of non-point sources, such as surface runoff, as well as wastewater and saline hot springs.

5.1.2 Perchlorate

Perchlorate is used as the main component in solid rocket propellant, and it can also be found in some types of munitions and fireworks. Perchlorate and other perchlorate salts are readily soluble in water, dissociating into the perchlorate ion, which does not readily interact with the soil matrix or degrade in the environment. The primary human health concern related to perchlorate is its effects on the thyroid. Perchlorate has been detected at low levels in MWD's Colorado River Aqueduct water supply.

Because of the growing concerns over perchlorate levels in drinking water, MWD adopted a Perchlorate Action Plan in 2002. As of December 2004, the amount of

perchlorate entering the Colorado River system has been reduced from approximately 1,000 pounds per day (lbs/day) to less than 90 lbs/day.

5.1.3 Uranium

Naturally occurring uranium has always been present in Colorado River water and has always been under the California Maximum Contaminant Level (MCL) of 20 picocuries per liter. The risks to water quality have primarily come from upstream mining in Moab, Utah and other potential mining sites in the west. Currently the U.S. Department of Energy is working to remove and dispose of mine tailings and improve groundwater quality on the Colorado River Watershed near Moab. The expected completion of this cleanup is between 2019 and 2025. Current levels are below MCL and can be treated by regional water treatment plants.

5.1.4 Nutrients

The Colorado River system has historically been low in nutrients, but nutrients are still a concern with population growth in the watershed. MWD is involved with upstream entities along the lower Colorado River to enhance wastewater management to control nutrient loading, especially phosphorus. The Colorado River's low nutrient level has been important for blending with State Water Project water to reduce the nutrient level delivered to retail agencies.

5.1.5 Arsenic

Arsenic is another naturally occurring element that is being monitored by drinking water agencies. The state detection level for purposes of reporting is 2 micrograms per liter (µg/l), and the MCL for domestic water supplies is 10 µg/l. Between 2001 and 2008, arsenic levels in Colorado River water have ranged from "not detected" to 3.5 µg/l. Increasing coagulant doses at water treatment plants reduces arsenic levels for retail deliveries.

5.2 The State Water Project

The California Aqueduct

The quality of State Water Project water as a drinking water source is affected by a number of factors, most notably seawater intrusion and agricultural drainage from peat soil islands in the Bay-Delta. State Water Project water contains relatively high levels of bromide and total organic carbon, two elements that are of particular concern to drinking water agencies. Bromide and total organic carbon combine with chemicals used in the water treatment process to form disinfection byproducts (DBPs) that are regulated under the federal Safe Drinking Water Act (SDWA). Wastewater discharges from cities and towns surrounding the Bay-Delta also add salts and pathogens to water, and they influence its suitability for drinking and recycling.

Actions to protect the Bay-Delta fisheries have exacerbated existing water quality problems by forcing the State Water Project to shift its diversions from the springtime to the fall, when salinity and bromide levels are higher. Closure of the Delta Cross-Channel gates to protect migrating fish has also degraded State Water Project water quality by reducing the flow of higher quality Sacramento River water to the State Water Project pumps at critical times.

5.2.1 Total Organic Carbon and Bromide

Total organic carbon and bromide are naturally occurring but are elevated due to agricultural drainage and seawater intrusion as water moves through the delta. The concern with both total organic carbon and bromide is that they form DBPs when treated with disinfectants such as chlorine. Some DBPs have been identified and are regulated under SDWA; there are others that are not yet identified. The potential adverse health effects may not be fully understood, but associations with certain cancers, reproductive and developmental effects are of significant concern. Water agencies began complying with new regulations to protect against the risk of DBP exposure in January 2002 under the DBP rule Stage 1. The U.S. Environmental Protection Agency (EPA) promulgated the Stage 2 DBP rule in January 2006, which has made compliance more challenging. CALFED's Bay-Delta Program calls for a wide

array of actions to improve Bay-Delta water quality and to control these elements of concern in the drinking water supply.

5.2.2 Nutrients

State Water Project supplies have significantly higher nutrient levels over the Colorado River supplies. Elevated levels of nutrients can increase nuisance algal and aquatic weed growth, which in turn affects taste and odor in product water and can reduce filter run times at water treatment plants. Nutrient rich soils in the Delta, agricultural drainage, and wastewater discharges are primary sources of nutrient loading to the State Water Project. Water agencies receiving State Water Project water have been engaged in efforts to minimize the effects of nutrient loading from upstream wastewater plants. Taste and odor complaints due to Delta nutrients are dependent on the blend of imported water delivered through MWD. MWD has developed a program to provide early warning of algae-related problems, taste, and odor events to best manage water quality in the system.

5.2.3 Salinity

Water supplies from the State Water Project have significantly lower TDS levels than the Colorado River, averaging 250 mg/l in water supplied through the East Branch and 325 mg/l on the West Branch. Because of this lower salinity, MWD blends State Water Project water with high salinity Colorado River Aqueduct water to reduce the salinity levels of delivered water. However, both the volume and the TDS levels of State Water Project water can vary significantly in response to hydrologic conditions in the Sacramento–San Joaquin watersheds.

The TDS levels of State Water Project water can also vary widely over short periods of time. These variations reflect seasonal and tidal flow patterns, and they pose an additional problem to blending as a management tool to lower the higher TDS from the Colorado River Aqueduct supply. For example, in the 1977 drought, the salinity of State Water Project water reaching MWD increased to 430 mg/l, and supplies became limited. During this same event, the salinity of the Colorado River Aqueduct water exceeded 700 mg/l. Under similar circumstances, MWD's 500 mg/l salinity goal could only be achieved by reducing imported water from the Colorado River Aqueduct. Thus, it may not be possible to maintain both salinity standards and water supply reliability unless salinity levels of source supplies can be reduced.

The CALFED Bay-Delta Program's Environmental Impact Statement/Environmental Impact Report, Technical Appendix, July 2000 Water Quality Program Plan, identified salinity targets that are consistent with TDS objectives in Article 19 of the State Water Project Water Service Contract. These include a ten-year average of 220 mg/l and a maximum monthly average of 440 mg/l. These objectives were set in the 1960s when MWD expected to obtain a greater proportion of its total supplies from the State Water Project. Because of reductions in expected State Water Project deliveries, MWD's Board believes that this standard is no longer appropriate, so it has adopted a statement of needs from the Bay-Delta. Under the drinking water quality and salinity targets element, the Board states its need "to meet Metropolitan's 500 mg/l salinity-by blending objective in a cost-effective manner while minimizing resource losses and ensuring the viability of recycling and groundwater management programs."

5.2.4 Arsenic

Between 2001 and 2008, arsenic levels in State Water Project water have ranged from "not detected" to 4.0 µg/l. Increasing coagulant doses at water treatment plants can reduce arsenic levels for retail deliveries. Groundwater storage programs in the State Water Project appear to provide the greatest risk of arsenic contamination; therefore, a pilot arsenic treatment facility has been installed to evaluate effective removal of arsenic at the storage site.